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## AMENDMENTS TO THE CLAIMS

This listing of the claims replaces all prior versions, and listings, of claims in the application:

## LISTING OF CLAIMS

1. [Cancelled]

2. [Cancelled]

3. [Currently Amended] The method as claimed in claim 221 wherein the route is optimized first for a primary availability parameter, and second for a secondary availability parameter.

4. [Currently Amended] The method as claimed in claim 221 further comprising determining whether the resource availability information associated with the selected optimal route is relevant to an abstracted link in the abstracted network map

5. [Previously Amended] The method as claimed in claim 22 wherein transforming the resource availability information of the abstracted link comprises formulating a metric information update message to be sent to the CNE, the metric information update message including resource availability information in units and in a format expected by the CNE.

6. [Previously Amended] The method as claimed in claim 22 wherein the respective resource availability information assigned to the abstracted link comprises a predefined fraction of the total resource availability of the selected optimal route, in order to offer a percentage of the available bandwidth to the client network element.

7. [Previously Amended] The method as claimed in claim 5 wherein the first NE is an edge NE of a data transport network that is connected by a link to the CNE and is

represented by a node of the abstracted network map, and wherein the method further comprises:

monitoring physical links in the underlying network adjacent to the edge NE to identify changes to resource availability of local physical links, and exchanging resource availability information with other NEs of the underlying network, in order to maintain resource availability information for all physical links in the underlying network;

the resource availability information being used to compute optimal routes between the edge NE and the other NEs represented by nodes in the abstracted network map.

8. [Previously Amended] A method for computing metric information for an abstracted link of an abstracted network map comprising a set of abstracted links interconnecting respective pairs of nodes, each node representing a corresponding Network Element (NE) of an underlying network having a plurality of NEs interconnected by physical links, the method comprising:

maintaining resource availability information regarding respective physical links of an underlying network at a first network element (NE) represented by a node in the abstracted network map;

using the resource availability information to construct a spanning tree rooted at a root node representing the first NE, the tree being constructed by:

iteratively expanding the tree to include a node adjacent to a node in the tree when a path from the root to the adjacent node corresponds to a route of optimal resource availability over physical links between the NE and a second NE represented by the adjacent node, among all of the paths from the root node to nodes not in the tree; and

for each abstracted link of the abstracted network map, assigning to the abstracted link respective resource availability information of the optimal route between the NE's represented by the respective nodes of the abstracted link.

9. [Previously Amended] The method as claimed in claim 8 wherein constructing the tree comprises constructing the tree so that each path in the tree from the root is optimized first for a primary resource availability parameter, and secondly for a secondary resource availability parameter.

10. [Previously Amended] The method as claimed in claim 8 further comprising transforming the resource availability information of the optimal paths between NEs of the abstracted network map into metric information for a related abstracted link, and forwarding the metric information to a client network element (CNE).

11. [Previously Amended] The method as claimed in claim 8 further comprising:

receiving a change in resource availability information relating to a physical link;

determining if the changed resource availability information might change an optimal path between the root node and a node representing another NE in the abstracted network map, and if so, re-constructing the spanning tree using the changed resource availability information.

12. [Previously Amended] The method as claimed in claim 8 wherein constructing the spanning tree comprises:

updating temporary labels of all of the NEs adjacent to permanently labeled NEs of the spanning tree with labels that include a path, a cost of the path and a bandwidth availability associated with the path;

making permanent a temporary label having a highest bandwidth availability, and having a lowest cost among the labels with the highest bandwidth availability; and

repeating the updating and making permanent until all of the NEs in the data transport network are permanently labeled.

13. [Previously Amended] The method as claimed in claim 8 wherein maintaining resource availability information comprises:

monitoring resource availability of local physical links that are adjacent to the NE;

exchanging changes in the resource availability of physical links with the other NEs of the underlying network; and

storing current resource availability information relating to each physical link of the underlying network in a link state database.

14. [Previously Amended] A network element (NE) of a data transport network, the NE being represented as a node in an abstracted network map comprising a set of abstracted links interconnecting respective pairs of nodes, each node representing a respective network element of the data transport network, the NE comprising:

a memory for storing a link state database including resource availability information relating to physical links in the data transport network; and

a processor for:

constructing a spanning tree rooted at a root node representing the NE using the resource availability information, by iteratively expanding the tree to include a node adjacent to a node in the tree when a path from the root to the adjacent node corresponds to a route of optimal resource availability over physical links between the NE and a second NE represented by the adjacent node, among all of the paths from the root node to nodes not in the tree; and

for each abstracted link of the abstracted network map, assigning to the abstracted link respective resource availability information of the optimal route between the NE's represented by the respective nodes of the abstracted link.

15. [Previously Amended] The NE as claimed in claim 14 wherein the processor iteratively expands the tree by identifying a path that is optimized for both a primary availability parameter, and a secondary availability parameter.

16. [Previously Amended] The NE as claimed in claim 15 wherein the processor is operative under program instructions for:

updating temporary labels of all nodes adjacent to a permanently labeled node of the spanning tree with labels that include a path, a cost of the path and a bandwidth availability associated with the path;

making permanent a temporary label having a highest bandwidth availability, and having a lowest cost among the labels with the highest bandwidth availability; and

repeating the steps of updating labels and making labels permanent until all of the nodes representing NEs in the abstracted network map are permanently labeled.

17. [Previously Amended] The NE as claimed in claim 14 further comprising a network control signaling system for exchanging changes in resource availability information relating to physical links in the data transport network with the other NEs of the data transport network, and for exchanging the resource availability information of the optimal routes between a first NE represented by a node of the abstracted network map with each of the other NEs represented by a node in the abstracted network map.

18. [Previously Amended] The NE as claimed in claim 17 wherein the NE is an edge NE connected by a link to a client network element (CNE) that uses the abstracted network map, and further comprises:

program instructions for transforming the resource availability information of an abstracted link into corresponding metric information; and

wherein the network control signaling system is adapted to send the metric information to the CNE.

19. [Previously Amended] The NE as claimed in claim 18 wherein the program instructions for transforming the resource availability information comprises program instructions for formulating a metric information update message to be sent to the

client network element (CNE), the metric information update message including resource availability information in units and in a format expected by the CNE.

20. [Previously Amended] The NE as claimed in claim 19 wherein the program instructions for transforming the resource availability information comprises program instructions for calculating a predefined fraction of the resource availability of the optimal route associated with the abstracted link, in order to offer a percentage of the available bandwidth to the CNE.

21. [Previously Presented] A method for assigning metric information to an abstracted network map comprising a set of abstracted links interconnecting respective pairs of nodes, each node representing a corresponding Network Element (NE) of an underlying network having a plurality of NEs interconnected by physical links, the method comprising:

computing each available route through the underlying network between a first NE represented by a node of the abstracted network map and each of the other NE's represented by corresponding nodes in the abstracted network map;

selecting, for each pair of NE's represented by nodes in the abstracted network map, an optimal one of the computed available routes based on local resource availability information related to the physical links in the underlying network; and

for each abstracted link of the abstracted network map, assigning to the abstracted link respective resource availability information of the optimal route between the NE's represented by the respective nodes of the abstracted link;

wherein selecting an optimal route comprises constructing a tree to span a graph of the data transport network, the tree being rooted at a root node of the graph representing the first NE and being iteratively expanded so that paths from the root node to other nodes in the tree correspond to routes of optimal resource availability with respect to the local resource availability information.

22. [Previously Presented] The method as claimed in claim 21, wherein assigning respective resource availability information of the optimal route to the abstracted link comprises transforming the resource availability information of the optimal route into corresponding metric information for use by a client network element (CNE).